

Projectile Lab

Purpose: To observe the motion of a projectile and analyze the motion as x and y vectors.

Theory/Hypothesis:

x - motion: constant velocity - $s_x = v_x t$

x-t graph will be linear, with slope = v_x

y - motion: constant acceleration,

$a = g = -9.81 \text{ m/s}^2$

y-t graph should be parabolic, $s_y = \frac{1}{2} g t^2 + u_y t$

u_y is the initial y component of the velocity

v_y -t graph should be linear with slope = g

assuming: negligible air resistance

Procedure:

video - projectile with ruler - plumb line optional
check capstone instructions

[http://physics-
pages.wikispaces.com/file/view/Using%
20Pasco%20Capstone.pdf/605895235/Using%
20Pasco%20Capstone.pdf](http://physics-pages.wikispaces.com/file/view/Using%20Pasco%20Capstone.pdf/605895235/Using%20Pasco%20Capstone.pdf)

screenshot, x-t graph, y-t graph, V_y -t graph
compare slope of v_y -t graph to -9.81 m/s^2

conclusion,
sources of uncertainty

eg.

you kick a soccer ball off a 30.0 m high cliff with a speed of 15.0 m/s, 30.0° above the horizontal. determine

- a) x and y components of the initial velocity
- b) time to hit the ground
- c) sx when it hits the ground.

compare with kicking the soccer ball horizontally.

